

October 17, 2013

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Room TW-A325
Washington, D.C. 20554

Re: *Ex Parte Notice*

Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, GN Docket No. 12-268;
Policies Regarding Mobile Spectrum Holdings, WT Docket No. 12-269

Dear Ms. Dortch:

In previous filings in this proceeding, T-Mobile USA, Inc.¹ has advocated for a one-third limit on the amount of below 1-GHz spectrum any single bidder can obtain in any individual market at auction because reasonable spectrum-aggregation limits prevent foreclosure and encourage wireless competition.² Well-crafted limits can also increase auction participation and enhance auction revenues.

On September 18, 2013, Verizon submitted a paper entitled *Economic Analysis of Proposals That Would Restrict Participation in the Incentive Auction* that argues spectrum-aggregation limits are unnecessary to prevent foreclosure and would reduce auction revenues.³ Prepared by

¹ T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.

² See, e.g., Reply Comments of T-Mobile USA, Inc., WT Docket No. 12-268, 39-50 (filed Mar. 12, 2013); Comments of T-Mobile USA, Inc., WT Docket No. 12-268, 23-35 (filed Jan. 25, 2013); Reply Comments of T-Mobile USA, Inc., WT Docket No. 12-269, 1-2 (filed Jan. 7, 2013); Comments of T-Mobile USA, Inc., WT Docket No. 12-269, 9 (filed Nov. 28, 2012).

³ Leslie M. Marx, "Economic Analysis of Proposals That Would Restrict Participation in the Incentive Auction" (September 18, 2013), attached to Letter from Tamara Preiss, Vice President, Federal Regulatory Affairs, Verizon, to Ruth Milkman, Chief Wireless Telecommunication Bureau, Federal Communications Commission, Gary Epstein, Chief, Incentive Auctions Task Force, Federal Communications Commission, and William Lake, Chief, Media Bureau, Federal Communications Commission, GN Docket No. 12-268 (September 18, 2013) ("Marx Study").

Leslie Marx, a Professor of Economics at Duke University, the paper's assertions are contradicted by Professor Marx's previous work, are anchored on erroneous assumptions, and depend on straw men arguments that overlook key elements of the proposed spectrum-aggregation limits. And yet, after spending 43 pages discussing how barring AT&T and Verizon from the auction (which T-Mobile does not propose to do) would reduce efficiency and revenue, Marx ultimately concludes, just as T-Mobile's auction experts have, that implementing T-Mobile's proposed Dynamic Market Rule would *not* reduce the amount of spectrum transferred from broadcasting to mobile broadband and would lead the auction to meet any revenue target set by the Commission.

Barriers to Entry Preclude Band-Entry Through the Secondary Market

Professor Marx first asserts that AT&T and Verizon are unlikely to foreclose smaller carriers from the 600 MHz auction. She claims there is a highly liquid market for low-frequency spectrum, identifies a number of low-frequency spectrum transactions, and professes surprise that neither Sprint nor T-Mobile have pursued secondary market transactions to acquire spectrum.⁴ In fact, the secondary market for low-frequency spectrum is highly illiquid and fragmented.⁵ Though discrete geographic purchases are possible, national footprints are unavailable outside of the auction environment. Wireless networks require a sufficient scale of spectrum in any one band to make network investment worthwhile and without large-scale license availability, any carrier without substantial prior holdings in the band faces considerable exposure risk in trying to acquire a sufficient footprint a few licenses at a time.⁶ Thus, it is difficult for smaller carriers to "bypass" the effects of auction foreclosure as Professor Marx suggests.⁷

⁴ *Id.* ¶¶ 27, 38, 41.

⁵ Even Professor Marx acknowledges that buying low frequency spectrum piecemeal may be a problem: "[t]here may be limitations to secondary market opportunities, and engaging in a sequence of small secondary market transactions may not be attractive for a carrier because of the risk that the carrier may be unable to purchase sufficient licenses at attractive prices to support its business plan." *Id.* ¶ 46.

⁶ Professor Marx seems to believe that exposure risk only affects Verizon and AT&T. For example, Professor Marx considers a hypothetical scenario in the 700 MHz auction that would have allowed Verizon and AT&T to bid on only one 5x5 MHz license. In that case, Marx states that while one might assume that these "smaller licenses would have substantial value by themselves," this assumption is "questionable . . . given the fixed costs Verizon and AT&T would incur deploying spectrum in a new band class." *Id.* ¶ 93 n. 52. Of course, smaller carriers without any low-band holdings face an even *greater* exposure risk than the larger carriers do from the same band class considerations, but Marx, in trumpeting the secondary market as a solution for low-band spectrum access, studiously ignores that risk.

⁷ *See id.* ¶ 26.

Low-Frequency Spectrum Is Best for Coverage and In-Building Penetration, not Capacity

Professor Marx also relies on the unstated but incorrect assumption that low-frequency spectrum is valuable only to expand network capacity. From this premise, she constructs the straw man position that foreclosure only occurs when AT&T and Verizon purchase “spectrum they do not need for their operations in order to ensure that their competitors remain capacity constrained.”⁸ As a result, Professor Marx asserts that Verizon and AT&T have no incentive to foreclose because Sprint and T-Mobile are not currently capacity constrained.⁹

The greatest value of low-frequency spectrum, though, is not to expand network *capacity*, but rather to enhance network *coverage* indoors and out. No commenter in this proceeding, other than Verizon and AT&T, has argued that non-dominant carriers want to acquire 600 MHz spectrum to increase capacity. Whether Sprint and T-Mobile are capacity constrained is thus irrelevant to their potential to be foreclosed.

Warehousing and Buildout Are Irrelevant to the Dominant Incumbents’ Ability to Foreclose

Nor, as Professor Marx’s straw man definition of foreclosure assumes, does foreclosure require the dominant incumbents to warehouse the spectrum they purchase. Regardless of whether AT&T and Verizon deploy the low-frequency spectrum they acquire in the incentive auction, this spectrum will still be unavailable to other carriers, and its inaccessibility will weaken the market shares of non-dominant carriers that are unable to compete with the superior coverage and in-building penetration of low-frequency spectrum licensees. In other words, foreclosure does not require the dominant incumbents to purchase spectrum they will not use; it simply requires them to keep their rivals from purchasing the spectrum.

For the same reason, Professor Marx’s proposal to “defeat” a foreclosure strategy through build-out requirements fails.¹⁰ Spectrum-aggregation limits and build-out requirements serve two different purposes. Spectrum-aggregation limits ensure multiple carriers can acquire low-frequency spectrum by preventing incumbents from shutting out rivals. Build-out obligations ensure license areas receive certain levels of service, regardless of who owns that spectrum or whether there is a competitive market. AT&T and Verizon could purchase the spectrum, deploy it, and still keep it out of the hands of competitors. The anti-competitive effect remains the same as if they warehoused it.

Indeed, imposing strict build-out requirements on incentive auction license winners may actually make it easier for the dominant incumbents to foreclose smaller carriers. Adding radios to existing towers to serve a similar band is relatively inexpensive compared to the cost of building

⁸ *Id.* ¶ 53.

⁹ *Id.* ¶ 55.

¹⁰ *Id.* ¶ 60.

out a completely new low-frequency network. With their extensive existing network of low-frequency deployments, which rest in part on frequencies awarded to the dominant incumbents without auction three decades ago, AT&T and Verizon may well enjoy lower deployment costs than their non-dominant rivals, which have far less and, in some cases, virtually no low-frequency spectrum. As a result, strict build-out requirements may give the two dominant carriers an enhanced ability to foreclose their rivals.

After-the-fact Divestitures Are Likely to Prove Inefficient, Costly, and Ineffective

Nor can inequities in spectrum distribution be addressed with post-auction divestitures as Professor Marx suggests.¹¹ Post-auction divestitures allow the dominant carriers both to choose the competitors they will face and to delay or prevent the strongest competitors from challenging them. Moreover, absent clear *ex ante* rules, firms may wrongly predict that they can acquire spectrum when they actually cannot, which will require costly, deployment-delaying divestitures that smaller competitors are poorly positioned to exploit. Similarly, firms may wrongly predict that they cannot acquire spectrum when they actually can, which risks awarding the spectrum to the less efficient operator and driving down auction revenue. Both types of errors in prediction are inherent in the after-the-fact divestitures Marx prescribes and will prove costly to competition and consumers.

Professor Marx next argues that AT&T and Verizon would be unable to successfully execute a foreclosure strategy. For example, she asserts that a joint foreclosure strategy for AT&T and Verizon would be difficult to develop because there will be uncertainty regarding the amount of spectrum that will clear and be available for auction.¹² However, AT&T and Verizon will both still be able to bid above the use value of the spectrum even with the potential for a variable supply of broadband licenses during the auction. The critical issue is not the dominant incumbents' capacity for improper collusion, but rather the amount of spectrum available: the more limited the number of licenses available, the easier and less costly it will be for the dominant bidders to foreclose other auction participants from securing the licenses they need to compete. With only seven paired licenses available under all of the leading band plans for the 600 MHz band, the risk of foreclosure remains high and the prospect of modest variations in supply is of little to no importance.

Anonymous Bidding Will Not Prevent Anti-Competitive Collusion or Coordination

Professor Marx also argues that the use of anonymous bidding will frustrate attempts to coordinate a foreclosure strategy as neither AT&T nor Verizon would know when one of the incumbents, rather than a smaller carrier, had won.¹³ Professor Marx contends that because

¹¹ *Id.* ¶ 63.

¹² *Id.* ¶¶ 69-71.

¹³ *Id.* ¶¶ 67-68.

AT&T and Verizon would not know when to stop bidding, they would directly compete against each other.¹⁴

Even with anonymous bidding, however, Verizon and AT&T can easily coordinate their bids. Each of the two dominant companies will want to make sure it is not weaker than its main competitor and if each company simply follows this strategy, they will foreclose non-dominant competitor from getting a nation-wide footprint. If there are an even number of licenses, Verizon and AT&T can each simply bid for at least a half of the licenses in a large fraction of major markets. If there are an uneven number of licenses, both Verizon and AT&T are well aware of markets where each is dominant, and can use this information to determine whose bids should be allowed to prevail in each market.

Reasonable Spectrum-Aggregation Limits Can Increase Participation and Revenue

Having disputed the possibility of foreclosure, Professor Marx uses the remainder of her paper to argue that spectrum-aggregation limits will reduce auction revenues. She begins from the premise that economic theory indicates that having more bidders will increase auction revenues.¹⁵ She thus concludes that a proposal that excludes bidders will decrease auction revenues.¹⁶ As an initial matter, of course, no party has proposed excluding either AT&T or Verizon. On the contrary, T-Mobile's proposed minimum access exception would ensure that all carriers would be allowed to win a minimum of 5x5 MHz in all markets.

Professor Marx's analysis also ignores the potential for smaller bidders to limit their participation in the face of foreclosing dominant incumbents. Adopting spectrum-aggregation limits will actually increase participation, which should, as Professor Marx has predicted in papers not sponsored by Verizon, enhance auction revenues.

Marx's Prior Work Undermines Her Current Analysis

Professor Marx nonetheless attempts to demonstrate that spectrum-aggregation limits will reduce auction revenues in this case by simulating the potential effects of spectrum-aggregation limits on previous auctions.¹⁷ Examining the 700 MHz auction in 2008 and the AWS auction in 2006, Marx concludes that revenues would have reduced if spectrum-aggregation limits had been imposed.¹⁸ As discussed in the papers submitted on behalf of T-Mobile by Jonathan Baker and by Gregory Rosston and Andrzej Skrzypacz, there are at least three different reasons why

¹⁴ *Id.*

¹⁵ *Id.* ¶¶ 77-80.

¹⁶ *Id.*

¹⁷ *Id.* ¶¶ 89-99.

¹⁸ *Id.* ¶ 101, 106.

auction limits can increase auction revenues: (1) increased participation because of a greater chance of winning a license; (2) increased participation because of a reduced exposure risk; and (3) increased competition through the Dynamic Market Rule. Marx ignores all three in her paper.

In addition, Marx's own prior work demonstrates that the revenues realized in the 700 MHz auction were because competitive bids from non-dominant participants drove up prices.¹⁹ Marx's 2009 study convincingly demonstrated that it was Google's participation as a non-dominant bidder that ensured the 700 MHz C Block reserve price was met and caused AT&T and Verizon to compete aggressively for licenses that they both wanted to win. In fact, had the Commission not put conditions on the C Block, Google likely would not have bid and would not have increased 700 MHz auction revenue. Further, had the Commission restricted the C Block to non-incumbent licensees, Google's bid would have won the C Block and revenues in the auction would probably have been much higher due to heightened competition for the other licenses. Such potential competition is one feature of T-Mobile's Dynamic Market Rule that can lead to increased revenue. Likewise, in the AWS auction, revenues would have been much lower without the competitive bids entered by the cable companies and T-Mobile.

Marx's Historical Allusions are Inapt

Professor Marx also appeals to the historical example of timber auctions in the 1980s, in which set-asides for small bidders allegedly reduced revenue.²⁰ She provides no details on the specifics of the set-aside program, though, and does not show that the program is even remotely analogous to the proposed spectrum-aggregation limits. Her analogy is especially inapt because spectrum, unlike timber, cannot be grown or imported. Few substitutes exist for low-frequency spectrum and its ability to penetrate walls and buildings and travel long distances. Unlike timber auctions, the 600 MHz auction is the only opportunity to acquire low-frequency spectrum for the foreseeable future.

Marx's Hypothetical Examples Are Incomplete and, as a Result, Seriously Flawed

Turning to projections of the incentive auctions, Professor Marx constructed a simple hypothetical auction model.²¹ In this set-up, 10 potential sellers each hold one license and face five potential buyers, each desiring four units.²² Sellers have an average price of \$0.50 per

¹⁹ Sandro Brusco, Guiseppe Lopomo, & Leslie M. Marx, *The 'Google effect' in the FCC's 700 MHz auction*, 21(2) INFORMATION ECON. & POLICY 101 (2009).

²⁰ Marx Study ¶¶ 86-88. One of the authors of that study, Jonathan Levin, is a consultant to the Commission and so can explain the differences in the two situations.

²¹ *Id.* ¶¶ 115-118.

²² *Id.* ¶ 115.

license, with individual sellers ranging from \$0 to \$1.²³ Buyers have an average price of \$0.75 per licenses, with individual buyers also spread between \$0 and \$1.²⁴ Using these inputs, Professor Marx ran two simulations of the incentive auction: one including all bidders and a second excluding two bidders.²⁵

Plotting a graph tracing all of the intermediate combinations of expected revenue and units cleared that were achievable depending on the auction design parameters chosen, Professor Marx concluded that in all possible configurations, excluding two bidders reduced both revenues and units cleared.²⁶ Specifically, in this hypothetical model, excluding two bidders reduced revenues by roughly 20% and the number of trades by 15%.²⁷

These results do not reflect the outcomes that can be expected in the actual incentive auctions however. Professor Marx's model, for instance, fails to accurately reflect the expected auction scenario because it assumes that the lack of spectrum-aggregation limits will have no negative impact on participation and competition in the forward auction. For smaller bidders to participate and bid aggressively, smaller bidders need to have a realistic prospect of winning. The risk of foreclosure by AT&T and Verizon in low-frequency spectrum is so great that with no spectrum-aggregation limits, small bidders will either not participate or, at a minimum, have to be more cautious to account for this exposure risk, which will reduce revenues.

Professor Marx's omission of key elements of T-Mobile's proposals also skews her results. In particular, the model compares a full participation and an exclusion scenario. Again, however, no party has suggested excluding either AT&T or Verizon from the incentive auctions. T-Mobile's proposal explicitly ensures that AT&T and Verizon are able to participate in every market.

Marx Ignores Auction-Design Strategies to Further Increase Revenue

Moreover, despite the concerns Professor Marx expresses over the exclusion scenario's potential to cause auction failure,²⁸ the model does not incorporate T-Mobile's Dynamic Market Rule proposal. The Dynamic Market Rule puts spectrum-aggregation limits to a market test, removing the limits if auction revenues are insufficient to meet the clearing target. Under this proposal, spectrum-aggregation limits would never jeopardize meeting the clearing target because it allows the auction to be run completely without limits if needed.

²³ *Id.* ¶ 116.

²⁴ *Id.*

²⁵ *Id.* ¶¶ 118, 121, Appendix E.

²⁶ *Id.* ¶¶ 121, 122.

²⁷ *Id.* ¶ 123.

²⁸ *Id.* ¶ 127.

Indeed, Marx's earlier work on Google's effect on the 700 MHz auction demonstrates how the Dynamic Market Rule has the potential to increase revenues by creating direct competition between the dominant incumbents. In the 700 MHz auction, Marx explained how the presence of Google forced the dominant incumbents to bid directly against each other for the remaining licenses, which both AT&T and Verizon wanted to win. In the same fashion, the Dynamic Market Rule relaxes the spectrum-aggregation limits one license at a time. With one new license available, both AT&T and Verizon will be forced to bid directly against each other for that single license, driving up revenues.

At the end of her paper, Professor Marx concludes that the Dynamic Market Rule would be a success. She predicts that putting reasonable spectrum-aggregation limits on the dominant carriers would increase auction revenues sufficiently so that there would be no shortfall in spectrum transferred.²⁹ Her conclusion is exactly in line with the rationale for the Dynamic Market Rule, and in agreement with T-Mobile's economists who designed the rule and wrote, "[b]y using the proposed Dynamic Market Rule, the Commission should not worry about spectrum aggregation limits leading to clearing an inefficiently low amount of spectrum, and the rule could lead to increased revenue relative to an auction with no spectrum aggregation limits."³⁰

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Professor Marx's model and its attendant conclusions do not reflect the outcomes that can be expected if spectrum-aggregation limits are adopted by the Commission. The model omits critical elements of actual spectrum-aggregation limit proposals and so produces distorted results. Furthermore, Professor Marx's historical analogies and simulations are contradicted by her own prior work or rely on misleading or wholly inapt comparisons. Likewise, she has failed to demonstrate that AT&T and Verizon would not foreclose smaller bidders from the auction. She relies heavily on incorrect assumptions that carrier capacity is the only rationale for acquiring low-frequency spectrum and that foreclosure can only occur when carriers warehouse spectrum. In fact, the primary reason to acquire low-frequency spectrum is to improve coverage in rural and suburban areas and in-building penetration throughout the country. Similarly, the anti-competitive effect of dominant carriers acquiring and deploying low-frequency spectrum is the same as if they warehoused it, making build-out requirements an ineffective defense against foreclosure.

AT&T and Verizon are able to, and have the economic incentive to, foreclose on competitors in the incentive auction. Well-crafted spectrum-aggregation limits can promote competition and

²⁹ *Id.* ¶ 135.

³⁰ Gregory Rosston and Andrzej Skrzypacz, "A Dynamic Market Rule for the Broadcast Incentive Auction: Ensuring Spectrum Limits Do Not Reduce Spectrum," attached to *Ex Parte* Notice of T-Mobile USA, Inc., WT Docket No. 12-268 (July 26, 2013).

enhance auction revenues by limiting the ability of the two dominant incumbents to prevent competitors from gaining access to the low-frequency spectrum they need to compete. Meanwhile, even Marx agrees that the Dynamic Market Rule will preserve the competition- and revenue-enhancing effects of spectrum-aggregation limits while ensuring that they never jeopardize the auctions' clearing target.

Pursuant to Section 1.1206(b)(2) of the Commission's rules, an electronic copy of this letter is being filed for inclusion in the above-referenced dockets.

Respectfully submitted,

/s/ Trey Hanbury

Trey Hanbury
Counsel to T-Mobile USA, Inc.